

## Amendments to the Specification

Please replace the paragraph beginning at page 1, line 5, with the following rewritten paragraph:

Benefit is claimed, under 35 U.S.C. § 119(e)(1), to the filing date of: provisional patent application serial number ~~\_\_\_\_/\_\_\_\_,\_\_\_\_~~ 60/294,877, entitled "PMM: A PIPELINED MAXIMAL-SIZED MATCHING SCHEDULING APPROACH FOR INPUT-BUFFERED SWITCHES", filed on May 31, 2001 and listing Eiji Oki, Roberto Rojas-Cessa and Jonathan Chao as the inventors, for any inventions disclosed in the manner provided by 35 U.S.C. § 112, ¶ 1. This provisional application is expressly incorporated herein by reference.

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 Claim 1 (original): For use with a switch having a first  
2 number of input ports, a second number of output ports,  
3 each of the input ports having the second number of virtual  
4 output queues, and a third number of subschedulers, each of  
5 the third number of subschedulers being able to arbitrate  
6 matching to each of the second number of output ports, a  
7 method for scheduling the dispatch of cells or packets  
8 stored in the virtual output queues, the method comprising:

9 a) for each of the virtual output queues, maintaining  
10 a first indicator for indicating whether the virtual  
11 output queue is storing a cell awaiting dispatch  
12 arbitration;

13 b) for each of the subschedulers, maintaining a  
14 second indicator  $F(i,j,k)$  for indicating whether the  
15 subscheduler is available or reserved; and

16 c) for each of the subschedulers, performing a  
17 matching operation, if it has been reserved, to match  
18 a cell buffered at a virtual output queue with its  
19 corresponding output port,

20 wherein each of the subschedulers requires more  
21 than one cell time slot to generate a match from its  
22 matching operation, and

23 wherein the subschedulers can collectively  
24 generate a match result for each output port in each cell  
25 time slot.

1 Claim 2 (original): The method of claim 1 wherein each of  
2 the subschedulers requires the third number of cell time  
3 slots to generate a match from its matching operation.

1 Claim 3 (original): The method of claim 1 wherein each of  
2 the subschedulers require no more than the third number of  
3 cell time slots to generate a match results from its  
4 matching operation.

1 Claim 4 (original): The method of claim 1 wherein fairness  
2 for best-effort traffic is maintained.

1 Claim 5 (currently amended): The method of claim 1 wherein  
2 the matching operation is a matching operation selected  
3 from a group of matching operations consisting of (A) Dual  
4 Round-Robin Matching ~~DRRM~~, and (B) iterative-SLIP ~~iSLIP~~.

1 Claim 6 (original): The method of claim 1 further  
2 comprising:  
3 d) if a cell buffered at a virtual output queue has  
4 been successfully matched with its corresponding  
5 output port, informing the virtual output queue.

1 Claim 7 (original): The method of claim 6 further  
2 comprising:  
3 e) for each of the virtual output queues, if the  
4 virtual output queue has been informed that it has  
5 been successfully matched with its corresponding  
6 output port, then dispatching its head of line cell.

1 Claim 8 (original): The method of claim 7 wherein the head  
2 of line cell is dispatched in a next cell time slot.

1 Claim 9 (original): The method of claim 1 further  
2 comprising:

3       e) if a cell buffered at a virtual output queue has  
4       been successfully matched with its corresponding  
5       output port, then dispatching its head of line cell.

1   Claim 10 (original): The method of claim 9 wherein the  
2   head of line cell is dispatched in a next cell time slot.

1   Claim 11 (original): The method of claim 1 wherein the  
2   first indicator, for each of the virtual output queues, for  
3   indicating whether the virtual output queue is storing a  
4   cell awaiting dispatch, is a count,  
5       wherein the count is incremented upon learning  
6   that a new cell has arrived at the virtual output queue.

1   Claim 12 (original): The method of claim 11 wherein the  
2   count is decremented when an available subscheduler is  
3   reserved for considering a head of line cell at a  
4   corresponding virtual output queue.

1   Claim 13 (original): The method of claim 1 wherein the  
2   second indicator, for each of the subschedulers, is set to  
3   indicate that the associated subscheduler is reserved if  
4   the first indicator indicates that a corresponding virtual  
5   output queue is storing a cell awaiting dispatch  
6   arbitration.

1   Claim 14 (original): The method of claim 1 wherein the  
2   second indicator, for each of the subschedulers, is set to  
3   indicate that the associated subscheduler is available if  
4   the associated subscheduler matches a cell buffered at a  
5   virtual output queue with its corresponding output port.

1 Claim 15 (original): The method of claim 1 wherein the  
2 second indicator is set to indicate that a  $k^{\text{th}}$  subscheduler  
3 is reserved if the first indicator indicates that a  
4 corresponding virtual output queue is storing a cell  
5 awaiting dispatch arbitration,  
6 wherein  $k$  is set to the current cell time slot  
7 modulo the third number.

1 Claim 16 (original): For use with a switch including a  
2 first number of output ports, a second number of input  
3 ports, and the first number of virtual output queues  
4 associated with each of the second number of input ports, a  
5 dispatch scheduler comprising:  
6 a) a third number of subschedulers;  
7 b) a first indicator, associated with each of the  
8 virtual output queues, for indicating whether the  
9 virtual output queue is storing a cell awaiting  
10 dispatch arbitration; and  
11 c) a second indicator, for each of the subschedulers,  
12 indicating whether the subscheduler is available or  
13 reserved,  
14 wherein each of the subschedulers is adapted to  
15 perform a matching operation, if it has been reserved, to  
16 match a cell buffered at a virtual output queue with its  
17 corresponding output port,  
18 wherein each of the subschedulers requires more  
19 than one cell time slot to generate a match from its  
20 matching operation, and  
21 wherein the subschedulers can collectively  
22 generate a match result for each output port in each cell  
23 time slot.

1 Claim 17 (original): The dispatch scheduler of claim 16  
2 wherein each of the subschedulers requires the third number  
3 of cell time slots to generate a match from its matching  
4 operation.

1 Claim 18 (original): The dispatch scheduler of claim 16  
2 wherein each of the subschedulers require no more than the  
3 third number of cell time slots to generate a match results  
4 from its matching operation.

1 Claim 19 (original): The dispatch scheduler of claim 16  
2 wherein fairness for best-effort traffic is maintained.

1 Claim 20 (currently amended): The dispatch scheduler of  
2 claim 16 wherein the matching operation is a matching  
3 operation selected from a group of matching operations  
4 consisting of (A) Dual Round-Robin Matching ~~DRRM~~, and (B)  
5 iterative-SLIP ~~iSLIP~~.

1 Claim 21 (original): The dispatch scheduler of claim 16  
2 wherein if a cell buffered at a virtual output queue has  
3 been successfully matched with its corresponding output  
4 port, the virtual output queue is so informed.

1 Claim 22 (original): The dispatch scheduler of claim 16  
2 wherein if a cell buffered at a virtual output queue has  
3 been successfully matched with its corresponding output  
4 port, its head of line cell is dispatched.

1 Claim 23 (original): The dispatch scheduler of claim 22  
2 wherein the head of line cell is dispatched in a next cell  
3 time slot.

1 Claim 24 (original): The dispatch scheduler of claim 16  
2 wherein the first indicator, for each of the virtual output  
3 queues, for indicating whether the virtual output queue is  
4 storing a cell awaiting dispatch arbitration, is a count,  
5 wherein the count is incremented upon learning  
6 that a new cell has arrived at the virtual output queue.

1 Claim 25 (original): The dispatch scheduler of claim 24  
2 wherein the count is decremented when an available  
3 subscheduler is reserved for considering a head of line  
4 cell at a corresponding virtual output queue.

1 Claim 26 (original): The dispatch scheduler of claim 16  
2 wherein the second indicator, for each of the  
3 subschedulers, is set to indicate that the associated  
4 subscheduler is reserved if the first indicator indicates  
5 that a corresponding virtual output queue is storing a cell  
6 awaiting dispatch arbitration.

1 Claim 27 (original): The dispatch scheduler of claim 16  
2 wherein the second indicator, for each of the  
3 subschedulers, is set to indicate that the associated  
4 subscheduler is available if the associated subscheduler  
5 matches a cell buffered at a virtual output queue with its  
6 corresponding output port.

1 Claim 28 (original): The dispatch scheduler of claim 16  
2 wherein the second indicator is set to indicate that a  $k^{\text{th}}$   
3 subscheduler is reserved if the first indicator indicates  
4 that a corresponding virtual output queue is storing a cell  
5 awaiting dispatch,

6                    wherein k is set to the current cell time slot  
7 modulo the third number.

Claims 29-33 (canceled)

1 Claim 34 (original): For use with a switch having a first  
2 number of input ports, a second number of output ports,  
3 each of the input ports having the second number of virtual  
4 output queues, and a third number of subschedulers, each of  
5 the third number of subschedulers being able to arbitrate  
6 matching to each of the second number of output ports, a  
7 method for scheduling the dispatch of cells or packets  
8 stored in the virtual output queues, the method comprising  
9 for each of the subschedulers, performing a matching  
10 operation, if it has been reserved, to match a cell  
11 buffered at a virtual output queue with its corresponding  
12 output port,

13                    wherein each of the subschedulers requires more  
14 than one cell time slot to generate a match from its  
15 matching operation,

16                    wherein the subschedulers can collectively  
17 generate a match result for each output port in each cell  
18 time slot, and

19                    fairness is maintained for best-effort traffic.

1 Claim 35 (original): The method of claim 34 wherein each  
2 of the subschedulers requires the third number of cell time  
3 slots to generate a match from its matching operation.

1 Claim 36 (original): The method of claim 34 wherein each  
2 of the subschedulers require no more than the third number

3 of cell time slots to generate a match results from its  
4 matching operation.

1 Claim 37 (currently amended): The method of claim 34  
2 wherein the matching operation is a matching operation  
3 selected from a group of matching operations consisting of  
4 (A) Dual Round-Robin Matching ~~DRRM~~, and (B) iterative-SLIP  
5 ~~iSLIP~~.